

## REMARKS

Applicants respond herein to the Office Action mailed May 23, 2006. Reconsideration is requested in view of the remarks below.

### **Background**

Applicants appealed the Examiner's final rejection of claims 1 through 5, 7 through 10, 12 through 17, 19 through 21, and 26 through 30, to the Board of Patent Appeals and Interferences (the "Board"). Appeal No. 2005-2075. On November 18, 2005, the Board issued a decision wherein the Examiner's rejections under 35 U.S.C. §§ 102 & 103 were procedurally reversed, and new rejections were set forth pursuant to 37 C.F.R. § 41.50(b).

Applicants chose to reopen prosecution, and timely submitted an amendment in accordance with the Board's suggestions. The Examiner rejected applicants' claims on new grounds in the May 23, 2006 Office Action. Applicants traverse these rejections herein.

### **35 U.S.C. § 103 Issues**

Claims 1-5, 7-10, 12-17, 19-21, and 26-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gwyn (U.S. Patent No. 4,397,422) in view of Farnan (U.S. Patent No. 5,456,023). Applicants respectfully traverse.

Applicants continue to submit that the Gwyn patent is merely directed to a non-analogous paint-spraying device for mixing and spraying different colorants utilizing a

venturi mixer system. Gwyn discloses a colorant mixing and spraying device (10) that includes a venturi mixer (18) having an inlet chamber (17), a throat region (19) and an outlet chamber (21). Three tubes (20) are connected to the throat region (19) whereby colorant is suctioned into the throat region from different containers (22) by the flow rate of air flowing from the inlet chamber (17) into the throat region (19). The colorants are mixed together in the venturi throat (19). The mixed colorant then flows from chamber (21) through a hose (26) to a spray gun (28) at a pressure high enough to vaporize the paint. Gwyn, Fig. 1; col. 2, lines 18-49.

In the present invention the apparatus includes a throat region that has a first aperture adjacent its first end for injecting a first CVD dopant and a second aperture adjacent its second end for injecting a second CVD dopant therein the throat region. Claim 1. This allows for atomization of the first and second CVD dopants by the carrier fluid and mixing of the atomized CVD dopants with the carrier fluid within the throat region. The exit nozzle, connects to the throat region at the second end, has an exit pressure lower than the second pressure. The exit nozzle is configured to introduce the mixture of atomized first and second CVD dopants with the carrier fluid within the CVD chamber. In so doing, this exit nozzle may have a third diameter greater than the second diameter to allow for a substantial decrease in pressure from the first pressure to the exit pressure, or alternatively, it may only have the same dimension as the throat region. That is, the exit nozzle may have a constant dimension that is equal to the dimension of the throat region, such that the exit nozzle is an extension of the throat region thereby maintaining the second pressure and

temperature for the atomized CVD dopants/precursors and the carrier fluid for introduction of the same into the CVD chamber. These aspects are absent in Gwyn.

Furthermore, as previously stated by applicants, in view of the present specification, it is clear that the meaning of the term dopant intended by the inventors, i.e., for the deposition of reactants and other dopants within a chemical vapor deposition chamber, is within the common meaning of the term. One of ordinary skill in the semiconductor arts would not interpret the term dopant to include dyes or paints, as neither are reactants that alter the properties of a pure substance. Inherent in the application of a chemical vapor deposition chamber is the understanding that the mixed dopants create an atmosphere within the entire chamber for application of the depositing material. A person of ordinary skill in the art would not use a spray gun to create an atmosphere of dopant material within an entire chamber. By its application, the spray gun is a directional device.

Applicants respectfully point out that a venturi design has never been used for chemical vapor deposition processing, or made or adapted to receive atomized CVD dopants/precursors, mixing the same with a carrier fluid and then outputting such mixture within the CVD chamber, as disclosed and claimed by applicants. As such, it is respectfully submitted that the claims of the instant invention include limitations not disclosed nor contemplated by Gwyn, such that Gwyn does not anticipate nor render obvious the instant invention.

Furthermore, Gwyn does not disclose differing temperatures within the inlet chamber, throat region and outlet chamber, nor does it disclose an exit nozzle

configured to introduce atomized chemical vapor deposition fluid and carrier fluid in a CVD chamber. Still further, Gwyn does not disclose an exit nozzle having the same diameter as the throat region, as recited in the pending claims.

Gwyn also does not disclose or suggest altering a nozzle angle such that the nozzle is configured to introduce an atomized chemical vapor deposition dopants/precursors and a carrier fluid into a CVD chamber. Nor does Gwyn disclose using the chemical vapor dopant TEOS, which would be extremely hazardous to a person holding a handheld sprayer applicator.

Additionally, for a number of other reasons stated in applicants' previously filed amendments, which applicants incorporate herein by reference, applicants respectfully submit that the prior art of Gwyn does not teach, suggest, or disclose the particular aspects claimed by the present invention.

Aside from the inapplicability of Gwyn to the present invention, the Examiner has further combined Gwyn with the "Advanced Cure Paint Spray Booth" of Farnan. The Farnan design is also in the painting arts, not chemical vapor deposition art for semiconductor processing. Moreover, this combination is inappropriate because, in part, Farnan is explicitly teaching away from painting. The Farnan design teaches an apparatus for drying a newly painted automobile. It does this by directing a high volume flow of air over the surfaces of a freshly painted automobile to accelerate drying. According to Farnan, the sides of a spray booth are fitted with a number of directable high volume air nozzles. The nozzles are individually aimed to provide a desired high airflow rate over the sides and top of the automobile. Farnan, col. 2, ll.6-

10. A high volume blower, such as a squirrel cage blower, draws air from near the top of the booth and delivers the air through a manifold to the nozzles. Farnan, col. 2, ll. 12-15. Thus, the Farnan design applies a plurality of air nozzles about a paint spray booth for drying. The Gwyn design teaches a paint spray gun. This requires a person to hold the gun while walking around the object to be painted, e.g., an automobile, in order to apply the paint. A combination of the two would require the Gwyn gun to be inserted within each air nozzle of the Farnan design, which would defeat the purpose of the air nozzles for drying. Farnan does not teach, disclose, or suggest applying paint through its air-drying nozzles.

To the extent the Examiner is simply using the Farnan design as a disclosure of a chemical vapor deposition chamber, applicants respectfully disagree with this combination. First, applicants note that the Examiner chose to combine a paint spray gun with a paint spray booth. These apparatus are in related fields (analogous art), and a suggested combination is at least plausible. The paint spray gun and paint spray booth are not, however, in the chemical vapor deposition art for semiconductor processing. Applicants submit that it would not be appropriate to combine the paint spray gun of Gwyn with a chemical vapor deposition chamber commonly used to treat semiconductors, nor applicants note, has the Examiner attempted to do so. Second, a paint spray booth is not a chemical vapor deposition chamber as described and known in the semiconductor arts. The paint spray booth of Farnan acts as a cover to reduce dust and dirt from coming in contact with the wet painted surfaces, and to direct airflow to reduce drying time. The paint spray booth of Farnan would not work as a

chemical vapor deposition chamber for receiving an atmosphere of mixed dopant that would allow for the simultaneous and uniform deposition of a material on a substrate.

Chemical vapor deposition (CVD) is a chemical process used in the semiconductor industry for the deposition of thin films of various materials. The process is performed in a chemical vapor deposition chamber where a semiconductor substrate is exposed to one or more volatile precursors, which react and/or decompose on the substrate surface to produce the desired deposit. Frequently, volatile byproducts are also produced, which are removed by gas flow through the chamber.

The Farnan patent teaches that paint spray booths are used to confine paint overspray and solvents, and reduce drying time. Farnan is silent on whether a paint spray source is actually used in combination with the chamber to paint the object. In the present invention, the cross-flow fluid injector apparatus is attached to the chamber wall, and in fluid communication with the chamber, to deliver dopant to the substrate under test without exposing the volatile byproducts outside the chamber.

The present invention teaches using a cross-flow injector to inject a dopant into a chamber. The cross-flow injector replaces an injector and manifold of the prior art. Thus, the cross-flow injector is attached to, and in fluid communication with, the chamber. Specification, p. 7, l.3 – p.9, l.12; Fig. 1 (prior art figure showing location of prior art injector that is replaced by the present design's cross-flow injector). The combined fluids from the cross-flow injector are transported into the chamber for mixing. To further distinguish the present invention, applicants have amended the claims to require that the fluid injection apparatus be in fluid communication with and

attached to the chamber. The combination of Gwyn and Farnan will not teach or suggest the attachment of a paint spray gun of Gwyn to the air-drying nozzles of Farnan.

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, *absent some teaching, suggestion, or incentive supporting the combination*. In re Geiger, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) (citing, ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984) (emphasis added)). Applicants submit that the claims, as amended, have now been brought into a condition where allowance of the entire case is proper. Reconsideration and issuance of a notice of allowance are respectfully solicited.

Respectfully submitted,

  
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